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THE INDICATIONS AND NATURE OF TREATMENT IN SEVERE ABDOMINAL INJURIES AND INTRA-ABDOMINAL HEMORRHAGES UNACCOMPANIED BY EXTERNAL EVIDENCE OF VIOLENCE.

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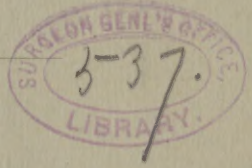

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MR. PRESIDENT AND FELLOWS OF THE ACADEMY OF SURGERY: Contrary to our custom, which has been for the orator on this occasion to present an address upon the advances made in surgery during the preceding year, I would beg the privilege of our Honorable President and Fellows to substitute therefor a paper upon a subject that must appeal to every practical surgeon, namely, "The Indications and Nature of Treatment in Severe Abdominal Injuries and Intra-abdominal Hemorrhage Unaccompanied by External Evidence of Violence."

Every surgeon has undoubtedly at some time in his experience, either in private or hospital practice, met with cases coming under the class covered by the title of this paper. These are cases in which the history and general condition of the patient give the impression that there is a serious lesion within the abdomen, and yet, upon examination, we find total absence or only slight evidences of injury. The tendency, I fear with many, is to treat these patients tentatively, only to be awakened at the autopsy to the fact that a rupture or a tear existed in the abdominal cavity, which, by early radical operation, could have been relieved.

The mortality in these cases is appalling; references to the literature of the subject will amply bear out this statement, which is readily accounted for by the nature of the injuries. Where the lesion is of the liver or spleen, if the patient does not die of shock or hemorrhage, a violent peritonitis supervenes to which he shortly succumbs. If the liver, spleen, or kidneys are involved, death from hemorrhage may ensue in a very short

time. Should the stomach, intestine, or bladder be ruptured and their contents poured into the peritoneal cavity, death from peritonitis is the result. In rupture of the mesentery the danger is from hemorrhage, yet, when the opening in the mesentery is small a clot may form sufficiently large to control the bleeding. Should death occur under these circumstances it would be the result of peritonitis caused by the free blood in the peritoneal cavity. I report a case of this character where recovery followed immediate operation. In ruptured extra-uterine pregnancy death is due either to hemorrhage or peritonitis.

The usual history of these cases, with the exception of extra-uterine pregnancy, is that the patient has received a direct injury to the abdomen, which is found to be unaccompanied by external evidence. These injuries may result from railroad accidents, from being caught between shifting cars, or from blows upon the abdomen received in various ways.

This class of injuries is quite common in military surgery, more so in the past when spherical balls were used and only a low velocity attained. A majority were supposed to be caused by the violence of the wind displaced by the passing ball, but we now know that they were due to the impact of the balls almost entirely spent.

Two cases which illustrate this occurred at the siege of Sebastopol. In neither did the clothing or the abdominal walls show any signs of injury, but in both the liver and spleen were comminuted to a pulp, and the intestines extensively lacerated (Mr. Hulke, *Lancet*, December 31, 1892).

As yet we have no reports from surgeons of the armies engaged in the present strife between Japan and China, but it will be of great interest to read the records of such cases. We can expect, I think, a very full and detailed account from the Japanese surgeons. We have all applauded the work of some brilliant individuals of the Japanese profession, and, in fact, we must assign to Japan in medicine the same standing that she has taken in other walks of civilized life, and which she has demonstrated she can hold.

The most prominent symptom is pain, which is accompanied by shock, the degree of which is dependent upon the extent of injury and the temperament of the individual.

I might say here that temperament and nationality have a strong bearing in the production of shock. Persons of a highly nervous temperament suffer more from shock than do phlegmatic individuals. For example, Americans are far more liable to suffer a severe degree of shock following injuries or operations than are the Germans.

The pain is peculiar and difficult to describe, but is readily recognized by one who has seen many of these cases and by the patient himself. It is not that of ordinary intra-abdominal affections, but is described by the patient as if something had given way or ruptured, and is usually accompanied by a consciousness of impending death. It is usually accompanied with tenderness, which will be more or less localized, unless the ensuing peritonitis be general. In the early stages of the injury, when shock is most profound, it may not be so pronounced, and if large doses of opium be administered it may be masked throughout the course of the trouble.

When vomiting is present it is usually associated with pain. Rarely does the vomited matter contain blood.

There is often seen a characteristic rigidity of the abdominal walls, which is due to intra-abdominal irritation. I have seen this so marked as to recall to mind the checker-board appearance of the normal abdominal walls as represented in the pictures of the early artists.

In the cases I have observed, consciousness has invariably been retained for varying periods of time. Restlessness is not usual in the early stages except in severe hemorrhage, but later on, when peritonitis develops, it is not an uncommon symptom.

The pulse and temperature vary according to the degree of shock. The former is weak and running, varying from 100 to 160, and the temperature subnormal. If reaction takes place the pulse becomes stronger and less frequent, and the temperature reaches the normal line. After reaction peritonitis is invariably the rule, and is accompanied by an accelerated and a high-tension pulse. The temperature under these circumstances is unreliable, as it does not correspond to the degree of inflammation or septic infection. A high temperature with a slow pulse is less significant than a rapid pulse with a low temperature. In cases of septic peritonitis, where autopsy revealed a belly cavity full of foul pus, I have seen the temperature run a normal course throughout the disease.

The part the sympathetic system of nerves, which has its largest distribution in the abdominal cavity, may play in injury to the abdomen is important in considering the differential diagnosis between the simple contusion and contusion accompanied by visceral lesion. In the former the absence of the severe and characteristic pain, of constant and persistent vomiting, of the anxious expression and presentment of impending death, and of any evidence of loss of blood, associated with the occasional presence of suddenly developed meteorism, will usually be sufficient to establish the differential diagnosis. This condition

of meteorism is due to paralysis of the muscular coat of the bowel consequent upon the concussion of the plexuses. There are cases, however, where it is very difficult to say definitely whether there be a visceral complication or not. Under these circumstances one can only wait for a comparatively few hours, when, if improvement is not apparent, the operative course is to be pursued. When the solid viscera are the seat of injury hemorrhage will be the main source of anxiety. The pain and the exsanguination give the clew. If the patient should react, which is unusual, unless the kidney is the injured organ, we will find, in addition, dulness on percussion in the flank. Rectal or vaginal examination may afford aid in determining the presence of a collection of blood in the pelvis. The solid organs suffer most from external violence on account of their fixity, density and close proximity to the bony structures. The liver is the most often injured, then the uterus, spleen and kidney, in the order named. The stomach is least often injured, there being very few such cases on record. Dr. J. W. Goff (*Medical and Surgical Reporter*, 1892), reports a case of ruptured stomach following a horse kick of the abdomen, verified by an autopsy. The shock was profound, and there was vomiting with absence of blood. The author states that he believes immediate operation would have saved the patient's life.

In the *Glasgow Medical Journal* for 1894, vol. xli, Andrews reports a case of rupture of the stomach without external evidence of violence, in which all the symptoms of a serious visceral lesion were present with the exception of vomiting. The rupture was upon the anterior wall; was about an inch long, and involved all the layers. I cite this case as one of special interest on account of the location of the tear and the absence of vomiting.

The liver is the organ most often affected because of its position beneath the ribs and against the spine, and because it is held firmly in place by strong ligaments and bloodvessels. It is most commonly ruptured on its upper surface, generally in the right lobe, and in a majority of such cases the injury proves fatal. Dr. H. P. Loomis (*Medical Record*, January, 1893) reports a case where the patient was struck by a pole protruding from the back of a wagon, which, when the wagon turned the corner, struck him on the right side, leaving no external evidence of violence. There was a three-inch tear in the right lobe of the liver and a pint of blood in the abdominal cavity. The patient died in the street from hemorrhage before medical aid could reach him.

Mr. Battle (*Lancet*, London, 1894), reports a case of rupture of

the bile duct, in a boy six years of age, who was run over by a hansom cab, in which there was but a slight shock without much pain or tenderness. Vomiting began early and persisted. On the fifth day slight jaundice developed. He was operated upon on the eighth day, and the abdominal cavity was found filled with bile. He died on the morning of the ninth day.

Autopsy. Liver and gall-bladder were intact, but about one-half an inch beyond the junction of the cystic and hepatic ducts the common duct was found to be torn completely through. No other injury was found.

J. E., aged forty-six years, was admitted to the German Hospital on November 17th, 1893, suffering from injuries received by being struck by a locomotive. He had a compound fracture of the lower jaw, lacerated scalp wound and fracture of four ribs on the left side, with no other signs of injury. He died six hours later. Post-mortem examination revealed a hematothorax of the left side. The peritoneum was not perforated or otherwise injured, but the peritoneal cavity was filled with blood. The spleen was completely comminuted, and the left kidney had been forced from its bed and was floating in the retro-peritoneal space. There was an extensive hemorrhage between the layers of the mesentery, and a hemorrhagic extravasation of the posterior wall of the stomach.

H. M. C., colored, aged sixteen years, was admitted to the German Hospital on the evening of December 3, 1894, with the following history: While playing about some moving freight-cars he was accidentally caught between the bumpers, sustaining an injury to his abdomen. Examination upon admission failed to disclose any evidences of external injury. The introduction of the catheter drew clear urine. There was a moderate degree of shock, and the patient complained of severe pain in the abdomen and tenderness on palpation. Further investigation proved negative.

The resident surgeon, Dr. Page, not deeming the case of sufficient severity to send for me, treated the patient for shock. When I examined him, upon the following day, it was very evident from the severity of the abdominal pain and tenderness associated with very decided rigidity of the abdominal walls, that he was suffering from a serious intra-peritoneal lesion. I decided to open the abdomen at once. As soon as the peritoneal cavity was opened a large quantity of dark liquid blood escaped. The small intestines were delivered, when the cause of the lesion was found to be a ruptured mesenteric vein, the bleeding from which was arrested by the presence of a large diffused blood clot occupying the interval between the layers of

the mesentery. To make sure that there was no other lesion, the large intestines, the stomach, the liver and the spleen were carefully examined, but with a negative result. The abdominal cavity was washed out with warm saline solution, glass drainage was introduced into the pelvis and the wound closed. Recovery was uninterrupted.

L. C., male, Italian, aged thirty-five years, was admitted to the German Hospital, with a history of a fall of about fifty feet, striking upon his abdomen. He was profoundly shocked and exsanguinated. The only external evidences of injury were some slight cuts on the hands and head. A diagnosis of internal hemorrhage was made, and the abdominal cavity opened up. Dark liquid blood escaped as soon as the peritoneum was opened, and the source found to be the mesenteric vessels. The mesentery was torn half way across and the intestines lacerated in four places. The mesentery was united with a series of catgut ligatures, and the rents in the intestines closed with the Lembert sutures. The abdominal cavity was washed out with hot saline solution and closed. He died two hours after the operation. The autopsy demonstrated several tears in the gut which had been overlooked, and several grapeskins and pieces of fig in the peritoneal cavity.

The most common form of intra-abdominal hemorrhage is that resulting from ruptured extra-uterine pregnancy. While these cases may be due to traumatism without any external evidence they are usually spontaneous. While hemorrhage from the pelvic organs of the female usually occur from a ruptured extra-uterine pregnancy, it may be due to other non-traumatic causes. Hematosalpinx may occur independent of pregnancy, and rupture either spontaneously or from traumatism. Again, degenerated bloodvessel walls, and especially veins, may rupture under similar circumstances.

M. E., aged twenty-four, nurse, admitted to German Hospital January 20, 1893. While lifting a heavy weight from an elevator she felt something give way in her abdomen. This was immediately followed by severe lancinating pain in the right ovarian region. She was menstruating at the time. Pelvic peritonitis promptly set in. An examination demonstrated a tumor in the right broad ligament about the size of a hen's egg. The peritonitis and tumor subsided to treatment, and she made a slow recovery. Diagnosis, pelvic hæmatocele from rupture of an engorged ovarian vein.

Hemorrhage itself is seldom the cause of death, but associated as it is with shock, the degree of which is out of all proportion to the severity of the accident, it is frequently fatal in

a very short time. When the peritoneum is wounded shock is still more profound, the so-called peritoneal shock.

Hemorrhage within the peritoneum is sometimes very slight and distinctly localized, and may occur several times during the course of the illness. It may take place between the layers of the broad ligament, and soon stop from the pressure.

I report the two following cases of hemorrhage from my list of operations for ruptured extra-uterine pregnancies, as they illustrate so typically the wisdom of immediate operation:

Mrs. A. K., aged thirty-one years, admitted to the German Hospital, September 21, 1894, with the following history. Six months prior to admission she had been subject to attacks of vertigo, pain in the back and limbs, and for the last six weeks to a constant bloody vaginal discharge. Examination revealed a retroflexed uterus with a slight tear of the cervix, and the presence of a small movable mass behind and to the left of the uterus.

September 25th, four days after admission, the patient was etherized, and the uterus was dilated and curetted. After the operation the discharge stopped, but the patient gained in strength very slowly. She was advised to submit to abdominal section, but preferred to wait until she was stronger. On the night of November 22d she awoke with a severe pain in the right side, and on attempting to walk to the water closet fainted. After being returned to bed she again fainted and went into a collapse, the pulse becoming almost imperceptible, and the temperature falling to 96°. Under active stimulation she reacted. The diagnosis was made of internal hemorrhage from rupture of a probable extra-uterine pregnancy.

The abdominal cavity was found filled with fluid blood and clots, and the right tube ruptured. The tube was tied off, and the abdominal cavity flushed with hot saline solution, a glass drainage-tube introduced and the wound closed. The patient was not much shocked by the operation, but on the contrary seemed rather improved. The drainage-tube was removed on the third day, the wound healed by first intention, and the patient made a good recovery.

Mrs. J. W., aged thirty-six years, was admitted to the German Hospital, November 21, 1894, with the following history. About two o'clock on the morning of admission she was seized with a violent pain in the lower abdomen. For this she took some whiskey, and was somewhat relieved. At nine o'clock the same morning she started for market, and was suddenly taken sick, becoming very weak and suffering from a violent pain in her

abdomen. She returned home with difficulty and called in Dr. Hand, who advised her immediate removal to the hospital. At the time of admission she was very weak, and there was distinct tenderness over the abdomen with slight dulness on the right side. Immediate operation was advised and consented to.

When the peritoneal cavity was opened it was found to contain fluid blood and clots. The right tube was the site of a small rupture, and was tied off and removed. The abdominal cavity was washed out with hot saline solution, glass drainage introduced and the wound closed. The patient was very much shocked by the operation and reacted slowly. During the operation hypodermatoclysis was practised. The drainage-tube was removed on the fourth day, the wound healed by first intention, and the patient was discharged, well, on the twenty-third day.

The following case of hemorrhage from ruptured extra-uterine pregnancy illustrates the danger of delay as strongly as did the two previous cases the efficacy of prompt interference:

Mrs. P., aged thirty years, was a patient of Dr. S. Cooke Ingraham, of Wissahickon, this city, who furnishes the following history:

I first saw the patient on January 29, 1892. She complained of severe abdominal pains, of a bearing-down character, and of a sense of fulness in the epigastric region. She had been married seven years, but had never been pregnant, and laughed at the possibility. For the past three years the menstrual flow had been decreasing in amount, and for several months past had been very scant. The breasts were slightly enlarged, but the areolæ were not darkened. The glands of Montgomery were a little more prominent than normal. She had suffered from morning vomiting for the past month.

I was hastily summoned to see the patient on the morning of February 2d, and found her in a state of collapse, pulseless, and with a temperature of 96.4°. She reacted to active stimulation and was sent to the German Hospital for immediate operation, a diagnosis of ruptured extra-uterine pregnancy of the tubal variety having been made. Upon admission her pulse and temperature were normal. She did not complain of pain. Examination of the abdomen and per vaginam and rectum failed to reveal any mass, although a circumscribed area of flatness could be demonstrated low down and to the right side. She continued in this condition until February 12th, when at her own request she was discharged. On February 23d she was readmitted at Dr. Ingraham's earnest request. At the time of the second admission the abdomen was markedly distended, being

tympanitic above and flat below. Pulse 116, temperature 101.5°. She complained of considerable pain.

The following day she was operated on, and when the peritoneum was opened a fetus with clots and fresh blood gushed out. The ruptured sac occupied the right iliac region, and was tightly adherent to the neighboring coils of small intestines, to the cecum and to the vermiform appendix. After a prolonged and tedious dissection the sac was enucleated; this was accompanied by very free bleeding, which necessitated packing of the cavity with gauze. The wound was closed with the gauze packing *in situ*. The patient died the following day of hemorrhage.

The immediate effects of an injury severe enough to cause a serious lesion of an abdominal viscus are sometimes so slight as to be misleading. Very often a patient with such a condition will walk to a conveyance or to the hospital, complaining only of a slight pain. In varying periods of time following the injury more decided symptoms will develop, viz., signs of hemorrhage if the solid organs be involved, and early peritonitis if the hollow viscera be ruptured or torn sufficiently to allow their contents to escape. When this occurs operation is imperatively demanded without delay. This is also true of hemorrhage consequent upon the rupture of an extra-uterine pregnancy, be it traumatic or spontaneous. In ectopic gestation operation will be necessary in every case at some period of its history; therefore, if a diagnosis can be made, or even a well-founded suspicion of the condition exists, rupture should not be allowed to occur. If rupture does occur, however, immediate interference is the only certain means of saving the patient's life. The longer the operation is deferred the greater the risk to life. Hasty operations, often necessitated by the patient's condition, are likewise less liable to reach a favorable termination. Blood clots or intestinal or gastric contents cannot be washed out of the peritoneal cavity except by prolonged and repeated flushing.

The almost universal fatality of intra-abdominal lesions of traumatic origin is so well recognized that it seems as if there could hardly be any question as to the wisdom of opening the abdominal cavity. I would not be understood as meaning that abdominal section should be used as a means of diagnosis, but on the contrary I believe that every known means, with attention to the most minute details, should be exhausted in establishing a diagnosis. When a diagnosis is impossible abdominal section is justifiable only when it becomes the last and only chance for the patient.

I have refrained from using the terms exploratory and diag-

nostic incisions, believing that they not infrequently serve as a shield to cover a lack of diagnostic ability. It is a moral obligation resting upon every physician and surgeon to develop to the utmost of his ability the highest diagnostic attainments

Aseptic surgery has undoubtedly been one of the greatest boons to humanity that this nineteenth century has brought forth. But to me it seems that it affords a great temptation to men who have not had experience and surgical training, and who have, therefore, not fully developed their diagnostic skill, to do operations which are not necessary for their patients' good or with a scientific precision.